WHAT IS CLAIMED:

1. The method and materials to make polymer-based objects, including

a) a process, which is the combination of injection, measurable pressure and microwave energy; and

b) the compositions used in this process and systems.

2. The use of said process and system in claim 1, wherein said process provides highly accurate shaping and hardening of polymers and polymer-containing composites.

3. The use of a hand-held microwave applicator to harden polymers and polymer-containing composites at the site of application (i.e., intra-oral, orthopedic).

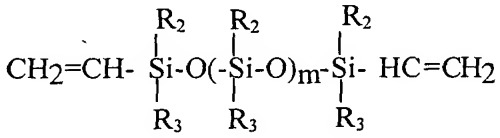
4. The compositions of claim 1, wherein said polymer-based materials are suitable for denture base, including one component and two component denture base, in which two kinds of denture base consist of mono-, di-, tri-, or multifunctional methacrylate polymers or monomers, cross-linking agent, organic pigments or metal oxides, plasticizers and initiators.

5. The composition of claim 4, wherein said mono-, di-, tri- or multifunctional methacrylate polymers are within the scope of the general formula:

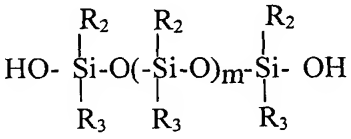
wherein R_1 represents hydrogen, an alkyl group, substituted alkyl group, a cyclic hydrocarbon, benzyl, ether, hydroxyalkyl; R_2 represents hydrogen, halogen, alkyl, substituted alkyl group; and n is an integer at least equal to 2.

6. The composition of claim 1, wherein said polymer-based objects, which are suitable for soft denture, consist of polymer-based materials including orgnaopolysiloxanes and phosphonitrilic fluoroelastomers.

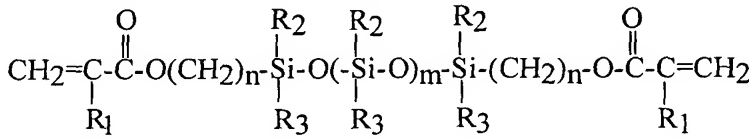
7. The composition of claim 6, wherein said organopolysiloxanes is within the scope of the general formula:



(III)

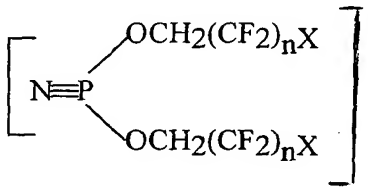


(IV)



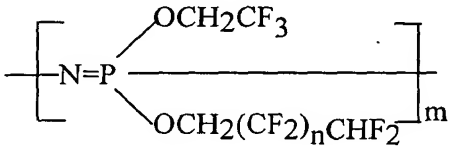
wherein m is an integer having a value form 1 to about 6,000; n is an integer having a value form 1 to 6; R_1 represents hydrogen or an alkyl group; and R_2 and R_3 represent alkyl groups having 1 to 6 carbons.

8. The composition of claim 6 wherein said phosphonitrilic fluoroelastomers is within the scope of general formula (VI):



(VI)

wherein X represents H or F, and n is from 1 to 11; and



(VII)

wherein n is 3, 5, 7, 9, or 11, and m is from 10,000 to 50,000.

9. The composition in claim 1, wherein said polymer-based objects are suitable for use as composite resins, and are comprised of a polymer matrix, fillers, initiator and coupling agent.

10. The composition in claim 9, wherein said polymer matrix is a polymerizable resin suitable for use in the oral environment, which includes 2,2-bis[4-(2-hydroxy-3-methacrylyloxpropoxy)phenyl]propane (BisGMA), ethylenehlycol dimethacrylate (EGDMA) and triethyleneglycol dimethacrylate (TEGDMA), eutectic monomers, hydrophobic monomers, urethane dimethacrylate resins, spiro orthocarbonates, organo-esters of phosphorus.

11. The composition in claim 9, wherein said fillers comprise comprise (silica) calcium, strontium, lanthanum, barium, rare earth, alumina, silicates, one or more fluorides of the rare earth metals, ceramics, zirconium, gold, silver, or silver-tin alloys.

12. The composition according to claim 1, wherein said composition including an organic filler, the range of 30 to 96%, relative to the overall weight of the composition.

13. The composition according to claim 11, wherein the fillers have a partial size ranging from 0.04 micrometers to approximately 10 micrometers.

14. The composition of claim 9, wherein said initiator comprises at least one microwave sensitive compounds from among benzoyl peroxide, dilauroyl peroxide, (tert-butyl peroctoate or tert-butyl perbenzoate, 2,4-dichorobenzoyl peroxide and 4,4-dechlorobenzoyl peroxide) in an amount of 0.05% to 1.0 %, relative to the weight of the composition.

15. The composition in claim 9, wherein said composition includes, as an accelerators, an amine accelerators.

16. The composition in claim 9, wherein said coupling agent includes, as a polyfunctional agent, gamma-methoxypropylene silane or other silane compositions.

17. The compostion in claim 9, wherein said coupling agent consists of thiomethacryulates.

18. The composition in claim 17, wherein the thiomethacylate has both thiol and methacrylate functionality.